

A study of neurosis and occupation

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Ferguson, D. (1973). *British Journal of Industrial Medicine*, 30, 187-198. **A study of neurosis and occupation.** Claims that male telegraphists in an Australian communications undertaking were unduly subject to neurosis and certain psychosomatic disorders as a result of the stress of their work were investigated by sickness absence and environmental and prevalence studies. The absence records of all telegraphists in the mainland capital city offices of the undertaking were compared with those of random samples of clerks and mechanics and, because of excess absence among Sydney telegraphists, with those of mail sorters in that city. Subsequently, 516 telegraphists, 93% of those available in Sydney, Melbourne, and Brisbane, and 155 Sydney mail sorters (79% of a sample) were examined medically.

Absence attributed to neurosis was much commoner in telegraphists than in the other occupations in each capital, and in Sydney telegraphists than in those of other capitals. Employees having such absence were more likely than others also to have uncertified and repeated absences, and absence attributed to bronchial and dyspeptic disorder and to injury. One-third (33%) of the 516 telegraphists examined were considered to have or to have had disabling neurosis, the prevalence being much greater in Sydney (44%) than in Melbourne (19%) or Brisbane (26%). The onset, course, associations, and other characteristics of neurosis are described.

There was some evidence that the neurotic employee had increased liability to some other disorders but also that he was more likely to report ill health than others. Interpretation of increased other ill health in neurosis is confounded by the effects of an excess indulgence in habits. An increase in indices of mental stress was noted but some disorders commonly attributed to stress were not unduly prevalent in neurotics. Loss of craft status, monotony, dissatisfaction with job, fear of displacement by machine, group size, and supervisory practices were all thought to predispose to the high prevalence of neurosis in Sydney telegraphists. However, personal and social maladjustment was particularly evident in telegraphists in that city, and the population from which telegraphists were drawn may have been less well adjusted in Sydney than in Melbourne or Brisbane.

Though it was possible in general to characterize the employee liable to neurosis, the predictive power of the characterization would be poor. The disorder followed no one pattern. Rather it appeared to be a collection of clinical syndromes which present as a result of the complex interaction of the personality with multiple factors at work and elsewhere over most of a lifetime. In individual subjects the relationship of stress at work to symptoms was usually ill defined, even in cases in which the identified probable factors were mainly or solely occupational. Nevertheless, there seems much to be gained from the establishment of mental health programmes in industry.

Claims by unions in an Australian communications undertaking that the health of their members was being affected by the stress of their work were extensively investigated by sickness absence and environmental and prevalence studies (Ferguson,

1969). Other aspects of the investigation, on occupational cramp (Ferguson, 1971a), on repeated absences (Ferguson, 1972), and on the possible effects of stress on health (Ferguson, 1973), have been reported already. The present purpose is to

consider prevalence and associations of neurosis in the population studied with a view to identifying occupational influences on neurosis.

Neurosis is not readily definable. There is no unanimity that it is a single entity rather than a collection of disorders. Diagnosis is based largely on symptoms and syndromes (Eysenck, 1960a). The distinction between clinically recognizable neurosis and normal mental defence mechanisms is not sharply drawn. It is not certain that neurosis lies on a continuum of mental health (Caplan, 1964), nor to what extent it is genetically or environmentally determined (Eysenck, 1963; Slater, 1964). The attempt to relate an acute neurotic episode to definite situations or objects is often a relative failure. Ignorance of cause has bred two main camps, the one whose followers adhere to psycho-analytical theories and the other to information and learning theory using conditioning methods in treatment (Eysenck, 1960b). Some neurotic reactions are accompanied by measurable biochemical change, and severe disorders of mood are now thought to have a biochemical basis (Davies, 1969).

Studies conclusively relating neurosis to environmental or occupational influences are few. Brill and Beebe (1955), in a follow-up of war neuroses, found that though the more dangerous spheres of duty carried higher rates of breakdown, 84% of men with overt neurosis had impaired preservice adjustment. Fraser (1947), in his wartime study of factory workers, considered that predisposition to neurotic illness could best be estimated from the individual's health record, personality, and physique. However, more neurosis than usual was found in association with some organizational and environmental stresses at work, including monotonous work. Of various influences at work suspected of adversely affecting mental health, those often the subject of scrutiny include automation (World Health Organisation, 1959; Raffle, 1965; Parmeggiani, 1966; Browne, 1966), shift work (Wyatt and Marriott, 1953; Thiis-Evensen, 1957; Andersen, 1958; Aanonsen, 1964; Lobban, 1965; Dirken, 1966; Trumbull, 1966; Taylor, 1967; McGirr, 1968; Martinez-O'Ferrall, 1968; Ferguson, 1971b), fatigue (Welford, 1965a; Brown, 1967; Cameron, 1968; Ferguson, 1971c), size of working group and job satisfaction (Revans, 1960; Herzberg, 1964; Welford, 1966; Mills, 1967) and noise (Broadbent, 1957; Ingham, 1970). Evidence is conflicting on the effect of each of these items on neurosis, even though they may disturb equanimity.

Estimates of the prevalence of neurosis or of the incidence of absence attributed to neurosis vary widely according to the methods and criteria of the investigators (Reid, 1960; Lin and Standley, 1962). Sutherland and Whitwell (1948) found the incidence of 'nervous disorders' in factory workers to be less

than 3%, in marked contrast to Fraser (1947), who judged 10% of his workers to have suffered from definite and disabling neurotic illness and a further 20% to have suffered from minor forms of neurosis during the course of six months.

Various authors have associated increased absence from work with neurosis or neuroticism (for example, Trice, 1965; Taylor, 1968; Howell and Crown, 1971; Ferguson, 1972). However, Hinkle, Plummer, and Whitney (1961) thought it wrong to assume that all those who are frequently sick are neurotic; most neurotics work with satisfaction (Semence, 1971). Neurotics are also more likely than others to be accident repeaters (Angeleri, Granati, and Lenzi, 1964), a liability that in any one individual varies in time with fluctuation in degree of neurosis in response to changing external stress (Smiley, 1955). Neurotics have also been found more likely than non-neurotics (Reid, 1960) or than other psychiatric patients (Warren, 1965) to have a previous history of physical ill health. To what extent the emotional stress implicit in increase of neurosis precipitates only 'illness behaviour', not illness as such, is still debatable (Thurlow, 1967).

Material and method

The incidence of disabling episodes of neurosis was estimated by a sickness absence study. The absence records of 765 telegraphists (the occupation mainly under study) continuously employed in all Australian State capital city offices of the undertaking over a two-and-a-half-year period were compared with those of 408 clerks and 415 mechanics chosen randomly in all capitals. Because total sickness absence was much greater among telegraphists in Sydney than in those of any other capital, which differed little among themselves, the 468 records of telegraphists in the other capitals were combined for comparison with the 297 in Sydney. For the same reason the records of 380 mail sorters and 80 supervisors in Sydney were added. The method and results in respect of absence generally (Ferguson, 1969) and repeated absence (Ferguson, 1972) have been reported previously.

Subsequently, all telegraphists in Sydney, Melbourne, and Brisbane and the mail sorters in Sydney who were available and willing (93% of telegraphists and 79% of mail sorters) were interviewed and examined medically (Ferguson, 1971a). Sickness absence records were available on those not interviewed. About half of the mail sorters were interviewed by Dr. C. C. Reid as a check on the method (Ferguson, 1969). The other half, and all of the telegraphists, were interviewed by the author. All groups studied were male.

Classes were selected for main groups of disease certified medically as causing absence, based on the method of the London Transport Executive (1956) using the code numbers of the *International Classification of Diseases* (World Health Organisation, 1957). Diagnoses suggestive of neurosis are often vague, and because in the eyes of some physicians and patients a stigma attaches to mental disorder a more acceptable symptomatic diagnosis

may be given on a certificate. Codes 300 to 318 of the International Classification include such conditions as 'disordered action of the heart' if specified as psychogenic. Some somatic complaints symptomatic of neurosis may be missed if unspecified, but on the other hand somatic complaints attributed to neurosis, for example nervous dyspepsia, may be wrongly included. Thirty-eight different diagnoses suggestive of neurosis were noted, the most frequent being anxiety state, nervous debility, neurosis, neurasthenia, nervous exhaustion, nervous dyspepsia, and nervous disorder, in that order. Neurosis was a frequent diagnosis among telegraphists in Sydney but was rare in other capitals, and the Sydney group had a greater diversity of diagnoses (32) than those in the other capitals combined (18). Nervous debility was a common diagnosis in Sydney telegraphists but was rare in mail sorters in that city.

The prevalence of neurosis was assessed from the medical interviews and examinations without the examiner being aware, at the time, of the absence record. A subject was not accepted as neurotic when he gave a history of only a transient or minimal reaction. However, a history of even one absence if severe, or persistence of disabling symptoms though mild, rated inclusion when there was no evidence of mental stress sufficient to produce a reaction in an average individual. In some subjects a history of such stress led to a diagnosis of gross stress or adult situational reaction (American Psychiatric Association, 1952). The rates derived for neurosis do not reflect point prevalence at the time of interview. Subjects were neurotic if they had suffered neurosis at some time during their service in the undertaking to a degree conforming to the definition by the World Health Organisation (1960) of a mental 'case'. Usually symptoms of neurosis even if disabling only in episodes rarely disappeared altogether once established. The patterns of neurosis of the American Psychiatric Association were used as diagnostic criteria. In assessing loss of working capacity it was not enough that a subject should mention absence attributed on a certificate to neurosis; the episode on enquiry had to be clearly of that nature. Absence owing to neurosis was not essential for acceptance of symptoms as disabling if loss of social capacity was present to a degree which constituted taking of social action, as required by the World Health Organisation's definition of a case. Necessarily, most cases of neurosis in a working population are slight compared with the patient who is continuously unable to work because of the disorder.

For acceptance of neurosis the symptoms had to conform to established patterns of the disorder and had clearly to constitute an illness to both subject and examiner. A solitary symptom such as sleeplessness, or vague symptoms with no recognizable pattern, or at interview such signs as tremor, hyperreflexia, and excessive sweating were not in themselves adequate criteria for acceptance. Tension headache was probably a symptom of anxiety reaction though a diagnosis of neurosis was not made on the basis of headache alone. So-called psychosomatic disorders and occupational cramp were not accepted as evidence of neurosis.

The decision whether neurosis was severe enough to have been a disability was often difficult. Neuroticism-stability is probably a continuous dimension, and all

apparently stable persons at some time manifest symptoms which in greater degree or persistence could be classed as neurotic. It was not possible in individual cases to go into mechanisms of neurotic reactions or personality disturbances. In any case such search is often unproductive or based on an unproven hypothesis. Enquiry into genetic, constitutional, childhood, and domestic factors was limited.

Neurosis was classed as mild, moderate or severe. Severity referred to the seriousness of the condition and was not determined solely by ineffectiveness, to which other characteristics contribute, nor necessarily in conformity with degree of disability. Personality and type, degree, and duration of stress were assessed when possible. Degree of disability referred not to current disability but to disability over the period of service in the undertaking.

The term 'significant' is 'used only in the statistical sense ($P < 0.05$) and the term 'associated' only if the connection mentioned was significant. Mention of a simple association between two variables is not to deny the complex interactions inevitably shared with other variables. Degrees of freedom of chi-square tests are not shown unless more than 1. The terms 'younger' and 'older' refer respectively to employees aged less than 40, or 40 or more years.

Results

Sickness absence

Overall the proportion of employees ('neurotic absentees') who had absence attributed to neurosis ('neurotic absence') was much higher in Sydney and in telegraphists than in other capitals and occupations respectively (Table 1). In every capital the rate for telegraphists exceeded that for clerks, which in turn exceeded that for mechanics.

Despite the outstanding neurotic absentee rate among telegraphists in Sydney, the average frequency of neurotic absence in neurotic absentees was no greater in this group than in other groups, and the severity rate of neurotic absences was rather less. Neurotic absentees in Sydney mail sorters had relatively frequent absences of short duration. Neurotic absentee rates in Sydney telegraphists by five-year age groups varied widely without apparent pattern. On the average, neurotic absentees in all vocations studied took two to three days more uncertified sickness absence than others in the two and a half years. Sydney telegraphists were not outstanding in this regard. Younger neurotic absentees among Sydney telegraphists had an increased liability to absence attributed to lower respiratory disorder, mainly bronchitis ($\chi^2 = 4.95$, $P < 0.05$), and to digestive disorder ($\chi^2 = 5.67$, $P < 0.02$) but not to absence in any other main diagnostic category. In every occupational group the employee who had had absence attributed to injury was more liable than the employee in the group as a whole to have had neurotic absence (Fig. 1). Among Sydney telegraphists each type of repeater

TABLE 1

NUMBERS OF EMPLOYEES IN CAPITAL CITY AND OCCUPATIONAL GROUPS WHOSE ABSENCE RECORDS WERE STUDIED, AND PROPORTIONS OF EMPLOYEES HAVING ABSENCE ATTRIBUTED TO NEUROSIS IN 2½ YEARS

Capital ¹	Telegraphists		Clerks		Mechanics		All occupations	
	n	%	n	%	n	%	n	%
Sydney	297	36	99	14	100	5	496	26
Melbourne	192	11	98	9	99	0	389	8
Brisbane	127	13	95	5	100	4	322	8
Adelaide	79	11	77	5	79	1	235	6
Perth	70	10	39	5	37	3	146	7
All capitals ..	765	21	408	8	415	3	2048*	13

¹ χ^2 values of tests of significance of differences between Sydney and the combined other state capitals were: for telegraphists 65.6 ($P < 0.001$); for clerks 4.8 ($P < 0.05$); for mechanics 1.7 ($P > 0.10$); and for all occupations 102.0 ($P < 0.001$).

*Including 380 mail sorters and 80 mail supervisors in Sydney; the rate in the former was 10%, in the latter (mostly older men) 21%.

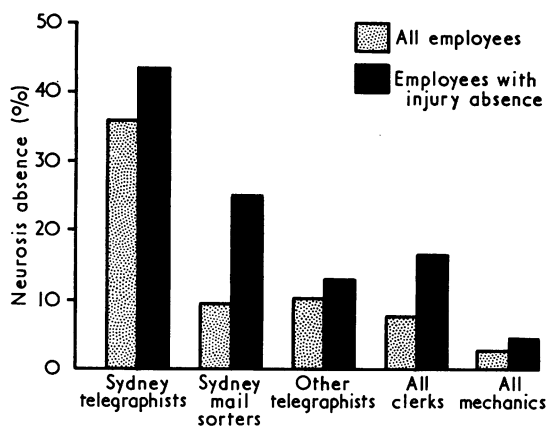


FIG. 1. Neurosis absence in employees with absence attributed to injury and all employees in five main occupational groups.

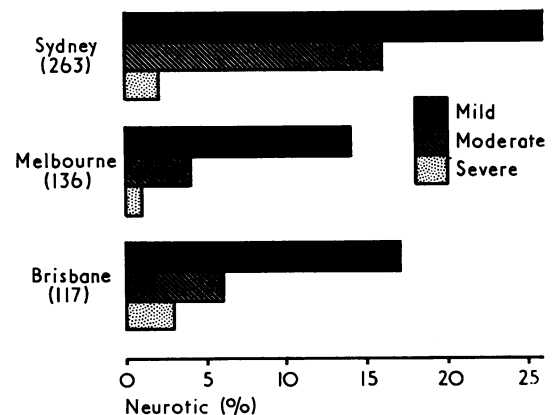


FIG. 2. Prevalence of neurosis in telegraphists, by capital and severity.

(‘chance’, ‘recurrent’, and ‘symptomatic’) was more common in neurotic absentees than others (Ferguson, 1972).

Prevalence

Out of 516 telegraphists interviewed in Sydney, Melbourne, and Brisbane, 171 (33%) were regarded as having or having had disabling neurosis as defined above. In 108 (21%) the disorder was mild, in 53 (10%) moderate, and in 10 (2%) severe. Neurosis was commoner in Sydney (44%) than in Brisbane (26%) or Melbourne (19%) ($\chi^2 = 29.01$, $df=2$, $P < 0.001$). The same order of prevalence by capital city applied to the mild and moderate grades of severity (Fig. 2).

Neurosis was commoner in operating telegraphists (36%) than in their (generally older) supervisory officers (25%) ($\chi^2 = 5.47$, $P < 0.02$) despite the greater overall prevalence in older (38%) than younger (29%) men ($\chi^2 = 3.87$, $P < 0.05$). Though mild neurosis was slightly commoner in younger (22%) than older (19%) men, many more older (19%) than younger (7%) had moderate to severe neurosis ($\chi^2 = 15.52$, $P < 0.001$). About a quarter (24%) of the 86 younger and a half (49%) of the 85 older men with neurosis (‘neurotics’) suffered moderately or severely. The prevalence of neurosis by five-year age groups (Fig. 3) agrees fairly well with the uniform age distribution noted in adults by Pasamanick *et al.* (1957).

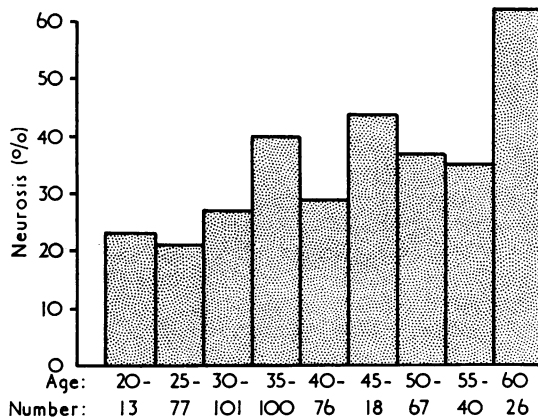


FIG. 3. Prevalence of neurosis by five-year age groups in 516 telegraphists.

The prevalence of neurosis in 155 older Sydney mail sorters was 15%. Each interviewer, Dr. C. C. Reid (16%) and the author (14%), found a similar prevalence in the half of this group that he examined, which supports Hamilton's (1968) contention that observer error in psychiatry can be reduced by careful definition of criteria.

Onset and course

No differences in prevalence of neurosis by school leaving age were noted. More neurotics than others entered telegraphy after the age of 20, a difference contributed to largely by Melbourne telegraphists ($\chi^2 = 7.29$, $P < 0.01$). In 33 cases (20%) onset of symptoms of neurosis occurred in childhood, and in all but 20 (12%) before the age of 40, the peak quinquennium of onset lying between 25 and 29 years (23%).

Eleven percent of subjects said they were free of symptoms between episodes of disabling neurosis. The great majority (92%) still had symptoms, not necessarily disabling, at the time of interview, and in most (80%) the course was relatively stationary. In 8% the symptoms were receding, and 8% had had no symptoms for many years. Few (4%) reported a progressively deteriorating course. Thus the course was mostly benign, if persistent. However, the groups studied were survivor populations; all subjects had been continuously employed in the undertaking for at least five years before interview. Nevertheless death or invalidity retirement due to neurosis during the period of two and a half years in which sickness absence was studied was no more frequent in telegraphists than in clerks, mechanics or mail sorters. However, rates for suicide, psychosis, alcoholism, ulcer, asthma, accident, cancer, and 'ischaemic or unspecified' heart disease were all

marginally (but insignificantly) greater in telegraphists. The course of neurosis observed was generally in keeping with the mostly favourable outcome noted for obsessional disorder (Grimshaw, 1965) and other forms of neurosis (Greer and Cawley, 1966), though it is unsatisfactory to compare people currently at work with patients treated at psychiatric departments of hospitals.

Deprivation of parents

Thirteen percent of 516 telegraphists had before the age of 11 been deprived of one or both parents, whether by death, divorce or other cause. The tendency for relatively more employees with such loss (42%) than without (32%) to be neurotic was not significant.

Family history of mental disorder

A history of mental disorder in the immediate family was more than twice as common in neurotics as in others ($\chi^2 = 22.99$, $P < 0.001$), a proportion noted also in each capital (Table 2). With or without neurosis, relatively more in Sydney ($\chi^2 = 8.23$, $P < 0.01$) gave a positive family history than in Melbourne or Brisbane, whose experiences were almost identical in this respect. Neurotics who had a positive family history were also more likely than other neurotics to admit to an unhappy, disturbed or broken adult domestic life ($\chi^2 = 6.11$, $P < 0.02$).

TABLE 2
NEUROSIS AND FAMILY HISTORY OF MENTAL
DISORDER IN TELEGRAPHISTS

Neurosis	Family history of mental disorder %			
	Sydney (263)	Melbourne (136)	Brisbane (117)	All (516)
Present ..	35	28	29	33
Absent ..	17	11	12	14

Drug taking

Regular taking of sedatives or tranquillizers for long periods was about as common as regular taking of analgesics, mainly aspirin or aspirin, phenacetin, and codeine compounds (Table 3). Considerable differences existed between capitals in the proportions of persons taking analgesics ($\chi^2 = 24.88$, $P < 0.001$) and sedatives, explained partly by differences in age structure between capitals but mainly by differences in prevalence of neurosis. More younger (15%) than older (10%) men regularly took analgesics, whereas more older (17%) than younger (9%) took sedatives ($\chi^2 = 4.37$, $P < 0.05$). More neurotics (25%) than non-neurotics (7%) took analgesics

TABLE 3
TAKING OF SEDATIVES AND ANALGESICS BY
TELEGRAPHISTS

Drug	Sydney (263)	Melbourne (136)	Brisbane (117)	All (516)
Analgesic ..	19	4	10	13
Sedative ..	13	4	19	12

($\chi^2 = 14.11$, $P < 0.001$) and also sedatives (29% and 3%). The difference in the case of sedatives was probably the result of prescription, although organic bromides could be bought over the counter. Analgesics would have been almost entirely unprescribed.

The liability of neurotics to take drugs of either class was associated, as would be expected, with tension headache, severity of neurosis, insomnia, irritability, depression, anxiety, and psychiatric treatment.

Other ill health in neurotics

Over half of telegraphists with (57%) or without (51%) neurosis had one or two other diagnoses made at interview. Only disorders of some importance or relevance were considered, such as asthma, chronic dyspepsia, or hypertension. One-third of either group (each 32%) had three or more. Insignificantly fewer neurotics (12%) than others (17%) had no other diagnoses.

Neurosis diagnosed at interview was associated with frequency of certified absence over a two-and-a-half-year period preceding the interviews (Table 4). However, the difference was almost entirely contributed to by the experience in Brisbane and Melbourne. The diagnosis of neurosis at interview was not associated with the taking of uncertified absence, contrary to the observation that such absence was increased in neurotic absentees. Half (50%) of neurotics among telegraphists in Sydney, one-third of those in Brisbane (32%), and a quarter in Melbourne (26%) had had neurotic absence. However, many non-neurotics had absence attributed to neurosis, more in Sydney (28%) than Melbourne

TABLE 4
PERCENTAGES OF TELEGRAPHISTS WITH AND WITHOUT
NEUROSIS HAVING VARIOUS NUMBERS OF
CERTIFIED ABSENCES IN 2½ YEARS

Neurosis	Numbers of absences in 2½ years		
	0-2	3-7	8+
Present (140) ..	43	38	19
Absent (262) ..	57	33	10

(9%) or Brisbane (4%) ($P < 0.001$), and more in younger (33%) than older (20%) men. Among telegraphists in Sydney, insignificantly fewer men with (14%) neurosis than without (22%) obtained unjustified certificates of absence.

Symptoms of neurosis

A symptom of neurosis was not accepted unless it was characteristic of the disorder and severe enough to have caused disquiet, discomfort or disability over an appreciable period. Symptoms were classed as mental (disorders of perception, thinking, affect and memory), physical (autonomic, mainly), and habit.

Differences between younger and older subjects in the prevalence of mental symptoms were minor (Table 5), with the exception of insomnia and depression (both $P < 0.002$), which tended to occur together. The mean number of symptoms per subject was 4.6.

TABLE 5
PREVALENCE OF MENTAL SYMPTOMS IN NEUROSIS

Symptom	Percentages		
	Age 20-39 (86)	Age 40-65 (85)	Age 20-65 (171)
Tension	72	79	75
Anxiety	69	69	69
Irritability ..	55	60	57
Insomnia	38	60	49
Depression ..	38	58	47
Restlessness ..	45	39	43
Fatigue	33	44	37
Emotional lability	22	19	21
Phobias	15	21	19
Obsession-compulsion	16	20	18
Indecision ..	8	14	11
Weakness	12	8	10

Overall each symptom was associated with some other symptoms and other attributes of neurosis on simple contingency tests; some 12 selected attributes out of 73 tested are arrayed in Table 6. For example, subjects who presented symptoms of depression were more liable than other neurotics to take drugs, to have allergies, and to be sleepless, restless, readily fatigued, inadequate, emotionally labile, and worried by responsibility and interpersonal domestic issues. They were also more liable to stutter, to have a severer degree of neurosis, and to require psychiatric attention. Though noise at work was often claimed as a source of aggravation of symptoms in men with irritability and tension, it did not on the whole trouble those who were depressed, presumably because they were withdrawn. It was often not possible to differentiate reactive and endogenous depression.

TABLE 6
INTER-ASSOCIATIONS OF SELECTED ATTRIBUTES IN 115 NEUROTIC SYDNEY TELEGRAPHISTS

	Attribute	1	2	3	4	5	6	7	8	9	10	11	12
1	Drug taking		*	*	**				*	***			*
2	Insomnia							**				*	
3	Anxiety								*	**			
4	Depression						*		**	***		**	
5	Sense of inadequacy								*	*	**		
6	Neurotic absence							***	**	***		***	**
7	GP advice sought								*	**		***	*
8	Referral to psychiatrist									***		**	
9	Severity of neurosis										*	***	
10	Onset at early age												
11	Older age at interview												**
12	Operator v supervisor												

*P<0.05 **P<0.01 ***P<0.001

Physical symptoms in neurosis were accepted if regarded by the subject as having resulted from mental disturbance and not from organic disease. They were recorded only if experienced under little or no perceived stress, that is, if they were inappropriate. The symptoms were often poorly related by the subject to external stress. In respect of all symptoms except palpitations and breathlessness, prevalence was insignificantly greater in younger than older subjects (Table 7). The symptoms were

as being contributory to their symptoms. Among personal and domestic reasons, the commonest were ill health of self or family (29%), housing finance (24%), other domestic difficulty, for example, marital discord, trouble with in-laws (29%), and sense of inadequacy (27%). Attribution of symptoms to a sense of inadequacy was associated with indices of severity and early onset of neurosis, which suggests a lifelong personality defect. Whether admitted as contributory to neurosis or not, 30% of neurotics reported an unhappy home life in childhood and 19% as an adult, the prevalence at both stages of life being greater in Sydney than in Melbourne or Brisbane.

Of stated occupational influences in neurosis, inability to cope with the job (44%), noise (37%), monotony (31%), responsibility (18%), job dissatisfaction (16%), supervisory inadequacy (14%), and poor ventilation (14%) were the commonest mentioned by subjects. Inability to cope, noise, and responsibility were each much more often mentioned by older than younger subjects.

On the basis of all available information in each case it was concluded that 26% of neurotics more or less exclusively experienced symptoms at work or related their occurrence thereto and that in 10% symptoms arose away from work. In 64%, symptoms could not be related solely to one or other environment. Rating of apparent external stress, using the classification of the American Psychiatric Association (1952), revealed evidence in only 22% of cases of a degree of stress sufficient to permit some causal relationship with neurosis to be reasonably established (Ferguson, 1973).

Impairment

The degree of impairment in neurosis generally ran parallel with severity. Of the 171 neurotic subjects,

TABLE 7

PERCENTAGE PREVALENCE OF PHYSICAL SYMPTOMS IN
 NEUROSIS

Symptom	Percentage		
	Age 20-39 (86)	Age 40-65 (85)	Age 20-65 (171)
Sweating	45	35	40
Trembling	37	35	36
Abdominal discomfort	40	29	35
Palpitations	26	28	27
Dizziness, faintness	26	19	23
Diarrhoea	14	13	14
Breathlessness	6	15	11

extensively interassociated. Only five subjects admitted to bedwetting at any age, and 12 to tics in adult life. Nail biting (20%) and stuttering (21%) as adults were each acknowledged by about one-fifth of neurotics. At interview excessive sweating of palms, axillae or face, increased tendon reflexes, and finger tremor were all significantly more common signs in neurotics than in others.

Stated contributory influences in neurosis

Most subjects mentioned more than one influence

35% were judged to have minimal impairment, 43% mild (definitely impaired social or vocational adjustment), 21% moderate (seriously impaired adjustment), and 1% severe. Severe impairment mostly would have precluded continued employment. In general, degree of impairment increased markedly with age.

Other associations of neurosis

Significant associations (mostly $P < 0.001$) were noted between neurosis generally and 17 other attributes. Some associations, such as those with tension headache, sweating, hyperreflexia, and tremor, are part of the symptom complex of neurosis. The greater susceptibility of neurotics to annoyance by noise, noted by Broadbent (1957), was confirmed. Neurotics preferred day shift to night, despite apparently greater stresses in day work. Adverse attitudes to job and supervision were strongly evident. The association of occupational cramp with neurosis is well established (Ferguson, 1971a). Neurosis was also linked with dyspepsia, peptic ulcer, smoking, and drinking, all of which were interassociated. The neurotic, significantly more often than other telegraphists, rented accommodation, indulged in neither sport nor hobby, and had spondylosis and recurrent myalgia of the trunk. On the average the grip strength of neurotics was relatively weak.

Associations with some attributes did not quite reach the 5% level of significance. Neurotics tended to be brought up in the city (noted also for New Yorkers by Srole *et al.* (1962)), to live more than an hour's travel from work, to be deprived of one or both parents before the age of 11 years, to be of less than average height, and to avoid double jobbing. No tendency ($P > 0.10$) was found for neurosis to be associated with other disorders, for example, hypertension, obesity, and asthma, sometimes claimed to be causally related thereto or to mental stress.

The predictive attribute analysis of Macnaughton-Smith (Williams and Lance, 1968) failed to show high-order interactions that were helpful in predicting neurosis. Application of the programme MULTIST (Lance and Williams, 1967) to 72 qualitative attributes, 11 numerical attributes, and 9 multi-state attributes revealed no high-level discontinuity and suggested that the system had little structure. A more powerful 'flexible' sorting procedure showed a division of neurotics into three subgroups; however, the types overlapped, and the collections of characteristics were viewed as peaks in a continuum.

Comparisons with Sydney telegraphists

Telegraphists in Sydney in general compared unfavourably with their colleagues in Melbourne and Brisbane in respect of some attributes relevant

to neurosis. The Sydney men aged 30 to 39 years had significantly more often remained single or had a broken marriage, and older telegraphists had more often married after the age of 30 years. Sydney telegraphists were more likely to enter the occupation after the age of 20. Smoking, drinking, and non-narcotic analgesic taking were much more prevalent in Sydney, as also were 'unjustified' certified sickness absence and a family history of mental disorder. Telegraphists in Sydney were also much more likely than those in Melbourne and Brisbane to express dissatisfaction with their job, with supervision, and with opportunity for advancement. Younger men more often had a sense of insecurity in their job.

Compared with older Sydney mail sorters, older Sydney telegraphists significantly more often took a second job, found work unsatisfying and opportunity inadequate, were dissatisfied with supervision and annoyed by work noise, drank moderately to heavily, and smoked more than 14 cigarettes daily. Though the greater prevalence of drinking and smoking in telegraphists in Sydney than in Melbourne or Brisbane could possibly be attributed to social differences between cities, the differences in the habits between vocations in Sydney suggests that occupation affected their prevalence. Despite factors lessening the comparability of older members of the two vocations in Sydney, the difference in prevalence of neurosis was great enough (49 to 15%) to indicate that influences at work probably contributed more than domestic or other social influences. By implication, the greater prevalence in telegraphists in Sydney than in Melbourne or Brisbane was also work-caused. The only probable occupational influences on neurosis revealed by comparison of the two vocations in Sydney were those reflected in the adverse attitudes to job satisfaction, opportunity, and supervision. Though annoyance by noise was linked with neurosis, exposure to noise was similar in each capital. More double jobbing in Sydney telegraphists than in mail sorters cannot be adduced as a factor in neurosis because a negative association between these attributes was found to exist in telegraphists; and second jobs were no more prevalent in Sydney, where neurosis was common, than in Melbourne where it was relatively uncommon. Other differences between the two Sydney groups which may have indicated vocational variation in social conditions were negligible or at least not significant. In matters such as conjugal state, numbers of children, deprivation of parents, home ownership, urban-rural origin, participation in sport and social activities, unjustified absence, and analgesic taking, mail sorters fared no better nor worse than telegraphists, suggesting that these attributes did not contribute particularly to neurosis in the latter.

Discussion

In each mainland state capital office of the undertaking studied, absence attributed to neurosis was commoner in telegraphists than in the other vocations studied, and in any vocation in Sydney than in the same vocation in other capitals. Thus, occupational and geographic differences existed, the combination of the two influences producing a particularly adverse experience in Sydney telegraphists. That the differences were real was confirmed by the prevalence study. Even in the absence of disabling neurosis, many employees displayed an unsatisfactory personal, social, and work adjustment that fell far short of optimal mental health. Whether as a result or not, many indulged in habits to an extent detrimental to physical health.

On Hogerzeil's (1968) hypothesis the absence pattern in Sydney telegraphists suggested a response to unfavourable management practices coupled with mental stresses exceeding capacity for ready adjustment.

The neurotic had more absence attributed to sickness than the non-neurotic and an increase of certain physical disorders, though not significantly more diagnoses of other chronic ill health made at interview. Thus, limited confirmation was given of accounts that neurotics are more likely than stable persons to suffer other disorders (Reid, 1960), but also of the tendency of neurotics to report rather than to have ill health. There was some evidence in neurotics connecting smoking and drinking with ulcer and dyspepsia but evidence also of increased occupational and other mental stress. However, diseases sometimes ascribed at least in part to stress, such as essential hypertension, coronary heart disease, bronchial asthma, and migraine, were not particularly prevalent in neurotics. Occupational stress appeared to loom larger than non-occupational stress, contrary to the findings of Köppich *et al.* (1968) in women.

In some respects the characteristics of the neurotic in the present study confirmed associations noted by Fraser (1947), for example, with muscular weakness, other illness, boredom, dislike of job, sedentary work, and disturbed human relationships outside work. The results also confirmed some findings of Kornhauser (1965) that mental health at work varies directly with job level and satisfaction and management practices, and inversely with the broadness of the hierarchical base.

Physical environmental conditions at work probably exerted any adverse effects through contribution to the general dissatisfaction evident in the offices. Lighting and the visual task were stressful in various ways, yet were subject of little complaint by neurotics, in contrast to Fraser's (1947) findings. Surroundings were drab, amenities

far from ideal, and ventilatory control often poor. Uncomfortable seating, crowding of work positions, and layout of equipment may have aggravated operating difficulty. Overall noise levels of about 83 dBA would certainly have interfered with communication and possibly with performance, and did excite behavioural response particularly in neurotics. However, in general the physical environment was of a similar standard in the three capital offices inspected, and thus could not be adduced as reason for the excess neurosis in Sydney telegraphists.

The semi-automated system of telegraphs, introduced in 1958, was probably a source of stress, less from its operation than from its implications for status, satisfaction, security, and opportunity. The change brought rôle alterations involving loss of both hierarchical and craft status for many. It brought also monotony, loss of personal contact, and machine pacing with less opportunity for job satisfaction. It brought unjustified fear of displacement by women or machine, yet men were frustrated at being trapped in a vocation the skills for which had little application elsewhere.

The effect of size may have operated at several levels. City size, noted by Chiesman (1957) to affect absence attributed to neurotic and digestive disorders in postmen, was probably not a factor in sickness absence in the present study. Apart from Sydney's poor record (Sydney is the largest capital in Australia), offices in other mainland capitals, which vary widely in size, varied little in incidence of absence. Size of undertaking, noted by Revans (1960) to affect absence and by Kornhauser (1965) to reflect mental health indices, probably had an effect on differences in neurosis between capitals, or at least created conditions of group 'non-support' which foster tension and antagonism (McClintock, 1965). Workroom size may have influenced neurotic absence through its effect on small group structure and on supervisory effectiveness (Welford, 1965b). To Bashford (1942) and Smith (1956) supervision was a main determinant of neurotic absence, but the apparent supervisory failure in Sydney was too great to attribute to size alone. The mental ill health implicit in adverse attitudes was to some extent a justified reaction to an intolerable situation (French and Kahn, 1962).

Some personal and social attributes apparently had little of their postulated stressful effect, at least as measured by the prevalence of neurosis and adverse attitudes. The strongest and most numerous associations with mental and physical health were noted in respect of smoking and drinking, themselves strongly linked. The very strong associations of these drug habits with neurosis probably reflected characteristics of the neurotic personality. However, the habits may themselves create anxiety, or contribute to general ill health.

There is no obvious reason why entrants to telegraphy should be particularly predisposed to neurosis (Smith, Culpin, and Farmer, 1927). To assume that they were would be to presuppose that a group of unstable persons was drawn on, whereas most men moved into telegraphy as a normal line of advancement in the undertaking. Within telegraphy the prevalence of neurosis differed between Sydney and the other two capitals studied, yet the standards of recruitment were said to be the same throughout Australia. The population from which entrants were drawn should not have differed in predisposition to neurosis, suggesting that conditions of service were responsible for making any predisposition manifest. However, personal and social maladjustment, for example in marital state, habits, and taking of unjustified absence, was more evident among the telegraphists in Sydney than in Melbourne or Brisbane. To what extent this observation indicated reaction or selection (Knupfer, Clark, and Room, 1966) is uncertain.

There are indications of relative social maladjustment generally in New South Wales, whose capital Sydney is. For example, rates of divorce, litigation, and drinking are higher than in other states. Entry to telegraphy occurred at a later age in Sydney. A high staff supervisory ratio was an unfavourable recruitment factor in that city. Selection of the less apt may thus have occurred, in addition to any unfavourable factors at work, which is in keeping with the hypothesis of recruitment of the less healthy to less favoured occupations (Lin and Standley, 1962).

The influence of stress on mental health is often overemphasized (Atkin, 1962). Mental reactions tend to be fitted to current theories of mental mechanisms often despite the patient's rejection of the link. Though stress acts on the predisposed, so that a stress is a function of the individual and of the environment, the occurrence of postulated signs of group occupational stress in an undertaking, such as neurosis, absenteeism, resentment of authority, and drinking (Ferguson, 1972; 1973), are as much warnings of failure in the undertaking as in the individual. Stress is not necessarily harmful; if support is available, events leading to mental stress may be strengthening, not weakening (Caplan, 1964).

Despite the ill-defined nature of the relationship between occupational stress and neurosis, there seems much to be gained from establishing a mental health programme in an undertaking. Some effort should be made to select applicants suited to their intended placement. Prediction of future neurosis is at present unsurely based on tests of personality. Exclusion from stressful tasks of all who record scores suggestive of emotional instability would keep out many who would be quite successful and who would have no mental disability. Exclusion would

be on surer ground if based in addition on a previous poor work and sickness record and history of frank emotional disturbance in the applicant, and on personality disorder, conflict or separation in parents.

The more effective use of persons with marginally unstable personalities could be combined with elimination of the more emotionally stressful aspects of the job. The organization of work may be modified to reverse the unfavourable attitudes found to be strongly associated with neurosis. Emotional security and morale may be improved by job enlargement, by increased identification, involvement, and communication, and by removal of irksome and unnecessary administrative procedures (Revans, 1960). The size effect may be lessened by decentralizing authority, increasing initiative and responsibility, and decreasing administrative rigidity.

The present study has revealed a relative failure of social adjustments in Sydney telegraphists compared to those in Melbourne and Brisbane. In considering occupational health, the two environments, work and home, cannot be divorced. A mental health programme in an undertaking should include some facility for counselling and health education, preferably centred on an effective occupational health service. An assessment of social adjustment and emotional stability could become part of the preplacement and periodic medical examination, so that the personality resources of the employee could be matched with the demands of the job; mental difficulty could then be foreshadowed, and the physician would be in a position to advise in the early stages of neurosis.

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